数式テスト

$$\nexists n \forall x, y, z((n, x, y, z \in \mathbb{N}) \land (x^n + y^n = z^n) \land (n \geq 3))$$

1. 自然演繹

$$\dfrac{A \Rightarrow B \quad A}{B}(\Rightarrow E)$$

$$\dfrac{A}{B \lor A}(\lor I)\dfrac{B}{B \lor A}(\lor I)$$

$$\dfrac{A \lor B \quad \dfrac{[A]^1}{B \lor A}(\lor I) \quad \dfrac{[B]^1}{B \lor A}(\lor I)}{B \lor A}(\lor E, 1)$$

$$\dfrac{A \lor (B \lor C) \quad \dfrac{\dfrac{[A]^2}{A \lor B}(\lor I)}{(A \lor B) \lor C}(\lor V) \quad \dfrac{[B \lor C]^2 \quad \dfrac{\dfrac{[B]^1}{A \lor B}(\lor I)}{(A \lor B) \lor C}(\lor I) \quad \dfrac{[C]^1}{(A \lor B) \lor C}(\lor I)}{(A \lor B) \lor C}(\lor E, 1)}{(A \lor B) \lor C}(\lor E, 2)$$

$$\dfrac{A \lor B \quad \dfrac{\begin{array}{c}\vdots \\ [A]^1\end{array}}{B \lor A}(\lor I) \quad \dfrac{\begin{array}{c}\vdots \\ [B]^1\end{array}}{B \lor A}(\lor I)}{B \lor A}(\lor E, 1)$$

X	$P(X = i)$
1	$1/6$
2	$1/6$
3	$1/6$
4	$1/6$
5	$1/6$
6	$1/6$

$$
\begin{prooftree}
\AxiomC{$A \vee (B \vee C)$}
\AxiomC{$[A]^2$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$A \vee B$}
\RightLabel{$(\vee V)$}
\UnaryInfC{$(A \vee B) \vee C$}
\AxiomC{$[B \vee C]^2$}
\AxiomC{$[B]^1$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$A \vee B$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$(A \vee B) \vee C$}
\AxiomC{$[C]^1$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$(A \vee B) \vee C$}
\RightLabel{$(\vee E, 1)$}
\TrinaryInfC{$(A \vee B) \vee C$}
\RightLabel{$(\vee E, 2)$}
\TrinaryInfC{$(A \vee B) \vee C$}
\end{prooftree}
$$

$$
\begin{prooftree}
\AxiomC{$A \vee (B \vee C)$}
\AxiomC{$[A]^2$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$A \vee B$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$(A \vee B) \vee C$}
\AxiomC{$[B \vee C]^2$}
\AxiomC{$[B]^1$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$A \vee B$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$(A \vee B) \vee C$}
\AxiomC{$[C]^1$}
\RightLabel{$(\vee I)$}
\UnaryInfC{$(A \vee B) \vee C$}
\RightLabel{$(\vee E, 1)$}
\TrinaryInfC{$(A \vee B) \vee C$}
\RightLabel{$(\vee E, 2)$}
\TrinaryInfC{$(A \vee B) \vee C$}
\end{prooftree}
$$

18.

$$
\begin{prooftree}
\AxiomC{$(A \to B) \vee (A \to B)$}
\AxiomC{$[A \to B]^1$}
\AxiomC{$[A]^2$}
\RightLabel{$(\to E)$}
\BinaryInfC{B}
\RightLabel{$(\vee I)$}
\UnaryInfC{$B \vee C$}
\AxiomC{$[A \to C]^1$}
\AxiomC{$[A]^2$}
\RightLabel{$(\to E)$}
\BinaryInfC{B}
\RightLabel{$(\to E)$}
\UnaryInfC{$B \vee C$}
\RightLabel{$(\vee E, 1)$}
\TrinaryInfC{$B \vee C$}
\RightLabel{$(\to I, 2)$}
\UnaryInfC{$A \to (B \wedge C)$}
\end{prooftree}
$$

37. 自然演繹

$$\vdash ((A \to B) \to A) \to A$$

$$
\begin{prooftree}
\AxiomC{$[\neg A]^2$}
\AxiomC{$[(A \to B) \to A]^3$}
\AxiomC{$[\neg A]^2$}
\AxiomC{$[A]^1$}
\RightLabel{$(\neg E)$}
\BinaryInfC{$\perp$}
\RightLabel{$(\perp)$}
\UnaryInfC{B}
\RightLabel{$(\to I, 1)$}
\UnaryInfC{$A \to B$}
\RightLabel{$(\to I, 1)$}
\BinaryInfC{A}
\RightLabel{$(\neg E)$}
\BinaryInfC{$\perp$}
\RightLabel{$(\perp_c, 2)$}
\UnaryInfC{A}
\RightLabel{$(\to I, 3)$}
\UnaryInfC{$(A \to B) \to A \to A$}
\end{prooftree}
$$